APPENDIX

Process the transmitted and received audio waveforms:

(a) normalize the transmitted and received audio waveforms so that they contain only positive data

(b) superimpose/align the normalized waveforms

(c) divide the calculated difference data into groups of envelopes, set the envelope width to 25% of the audio CODEC buffer size (an audio packet would be four consecutive envelopes)

(e) summarize the enveloped data and determine the data losses and loss rate

Shift, alternatively, the transmitted (or received) audio data as follows until the lowest point vertex is determined

WHERE start_Shift=1

range_Shift=4 (to acquire a minimum of five empirical values including the initial data loss value, 0^{th} shift group)

shiftGroupSize=defined for CODEC being used

WHILE NO Vertex

For shift=start_Shift to range_Shift

(a) set shift_Increment_Direction= (shiftSize+(-shift*(((-1)^{shift})))

(b) set shiftSize=shift_Increment_Direction * shiftGroupSize

(c) shift waveform by shiftSize

(d) obtain difference by subtracting the transmitted waveform from the received waveform

(e) divide the calculated difference data into groups of envelopes, set the envelope width to 25% of the audio CODEC buffer size (an audio packet would be four consecutive envelopes)

(f) summarize the enveloped data and determine the data losses and loss rate

(g) store data loss rate in array

Analyze the collected data loss rate data from the array to find the lowest vertex point

If no vertex is identified, then

(a) change the start_Shift and range_Shift for two additional shifts and loss calculation data points:

start_Shift=range_Shift+1

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                range_Shift=range_Shift+2
     Else
          Found Vertex - Conclude shifting process
     End if
     End While Loop
```

Extract the optimum data loss and associated frequency for final result

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